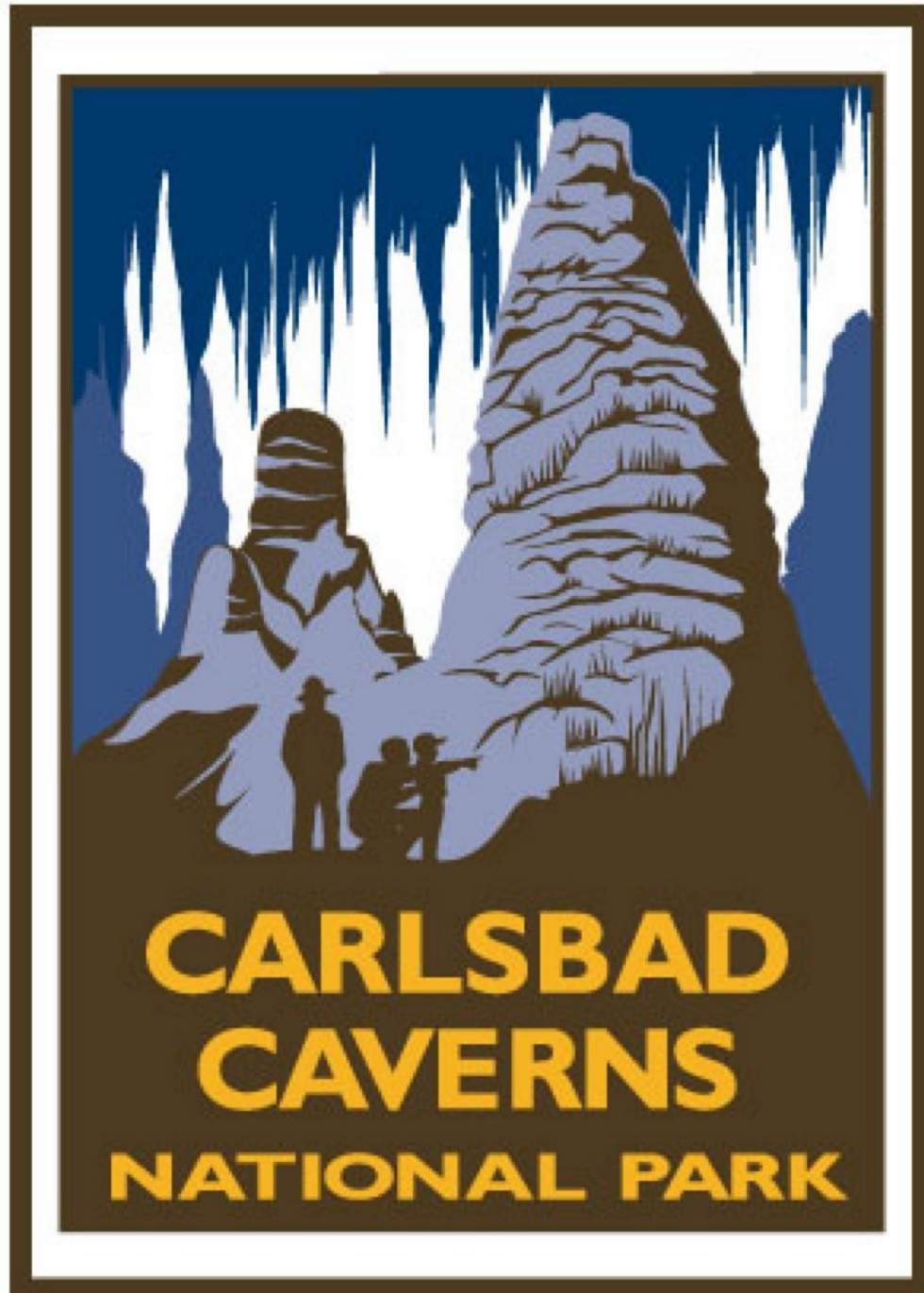


# About Bats, Caves, & Deserts

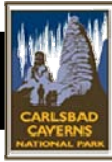
A curriculum and activity guide for Carlsbad Caverns National Park



## *Elementary School*

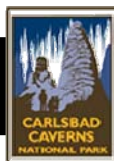






## Section 8 – Stewardship Activities

- The “LITTERary” Arts
- Don’t Touch
- A National Park: My Responsibility
- Who, Me, Make Lint?
- Lint Ecosystems



## The “LITTERary” Arts

### Pre-Visit, Field-Trip and Post-Visit Activities

#### Primary/Elementary Level

**Science** (Life, Science in Society), **Art** (Visual)

**1 Hour**

**Objective(s).** Students will predict the effects litter has on wildlife.

Students will propose ways to eliminate these dangers.

**Related NM Content Standards with Benchmarks.** SC11-E6, SC16-E4, AE2-E7

**Method.** Students collect litter, evaluate it and create a collage.

#### **Materials.**

- Each Student: plastic gloves, plastic trash bags for collecting litter
- Each Team: poster board, glue, different types of litter

**Key Vocabulary.** litter, stewardship

**Background.** There are countless beautiful, special places around the world. And all it takes is a little litter to make a place ugly and alter nature’s perfect balance. Litter causes injury, illness and even death to wildlife. Fishing lines can become tangled around a bird’s beak and prevent it from eating. When tangled around an animal’s legs, fishing line prevents the animal from running. Plastic six-pack rings can get caught around fish and other wildlife. As the animal grows, the non-expandable rings cause a slow, squeezing death. Cans and bottles can trap small animals and lead to their death. Cigarette butts, cellophane wrappers, styrofoam cups and other trash can be eaten by deer, causing internal problems and poisoning.

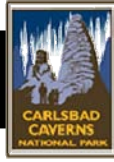
#### **Suggested Pre-Visit Procedure**

1. Divide the class into teams of 3 or 4. Have each team draw a picture of the way the park looks now.
2. Explain to students that Carlsbad Caverns National Park has more than half a million visitors every year. On a busy day, the park may have four thousand visitors or more. Imagine what the park would look like if each visitor littered just once on a busy day. How would the park look if every visitor littered over an entire week? A year?
3. If students have visited Carlsbad Caverns National Park, have each team draw a picture of the park as it looks now.
4. Have students pretend that 4,000 visitors littered the park on a single day. Instruct each team draw a picture of Carlsbad Caverns on that day.
5. Have each team present both their pictures and talk about the Carlsbad Caverns National Park that they would want to visit.

**Suggested Field-Trip Procedure**

1. Divide the class into teams of 3 or 4.
2. Distribute a pair of plastic gloves and a plastic trash bag to each student.
3. Have each team contribute bags of litter that they found on school grounds, parks or other areas. These items should be things found where wildlife could get to them, not from trash cans. CAUTION students not to pick up broken glass, syringe needles or sharp metal.

**Suggested Post-Visit Procedure.** Using the litter, have each team make a collage by gluing the litter to the poster board. Have students evaluate the litter and decide which is most harmful to wildlife. Ask students to propose ways people can eliminate litter pollution. What are some alternative ways to package six-packs? How can individuals be told about the dangers of litter? What can students do personally to reduce litter?



## Don't Touch

### Pre-Visit Activity

#### Primary/Elementary and Intermediate Levels

**Science** (Unifying Concepts), **Mathematics** (Unifying Concepts)

**30 Minutes**

**Objective(s).** Students will demonstrate that skin contains oil.

Students will theorize concerning the effects skin oils have on speleothems.

Students will calculate human impact on cave formations given a specific number or time.

**Related NM Content Standards with Benchmarks.** SC1-E1, SC2-E3, MA1-E1, MA1-E5, MA1-M4, MA1-M6, MA3-E2, MA4-E4, MA4-M4

**Method.** Students demonstrate how touching can damage a speleothem.

**Materials.** mirror, limestone rock, water

**Key Vocabulary.** speleothem

**Background.** Oil and dirt from hands can damage speleothems. By simply touching speleothems, oils are left behind. Touching can also dull the color of speleothems, sometimes staining them. Touching can also stop the growth of speleothems. Since speleothems are formed with water, oil creates a barrier that does not allow dissolved minerals to continue to deposit.

#### Suggested Procedure for Mirror Activity

1. Have each student touch the mirror. This works best after lunch or recess when their hands are likely to be dirty and sweaty.
2. Show the class the mirror covered with finger prints. Explain that they have changed the appearance of the mirror. A mirror can be cleaned with cleaner, speleothems in a cave cannot. Why would you not want to use cleaners such as Windex, to clean cave speleothems?
3. Facilitate class discussion.

What happens to rain water when it falls on an oily spot on your driveway? What comparison can be made with oil-coated speleothems?

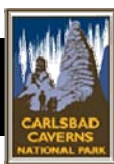
Students use a calculator to determine the following. Carlsbad Caverns National Park has more than a half-million visitors a year. If five percent of were to touch speleothems, how many people would that be? Do you think that many people touching speleothems damages the cave? Do you think the park's "No-Touch Rule" is a good one? Have students justify their answers and discuss.

### **Suggested Procedure for Limestone Rock Activity**

1. At the start of the school day, give students the following instructions with no background information.

"I have two limestone rocks. Do not touch the rock on my desk. At all times, someone in the class must be touching the rock in my hand. Pass it around so everyone will have an opportunity to handle the rock. Before school is out for the day, we will compare the two rocks."

2. An hour before school is dismissed, ask students to form an hypothesis. Which rock will be *water-resistant*?
3. Test the hypothesis by having one student drop water on the rock on the desk. Have students observe and record their observations.
4. Have another student drop water on the handled rock. Have students observe and record their observations.
5. Facilitate a class discussion. What happened? Why?



## A National Park: My Responsibility

### Post-Visit Activity

### Intermediate and Secondary Levels

**Social Science** (History),

**Science** (Unifying Concepts, Life), **Language Arts** (Research & Synthesis)

**Five 45-Minute Sessions**

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**Objective(s).** Students will describe at least two types of decisions involving managing a park.

Students will define their roles in building the park and describe at least four jobs needed to manage parks.

**Related NM Content Standards with Benchmarks.** SC2-M3, SC2-H3, SC11-M6, SC11-H6, LA10-M3, LA10-H3, LA10-H4, SS4-M4

**Method.** Students create their own model of a national park to demonstrate what they have learned about the National Park System and managing natural resources.

**Materials.** slide program or video about national parks, maps and brochures of national parks, various other materials according to the model chosen—markers, modeling clay, construction paper, paper for a mural, masking tape, scissors, sandpaper, grass carpeting, bricks, canvas, various containers, paint, water, artificial plants, toy animals, plaster of paris, rocks, miniatures of natural/historic objects, etc.

**Key Vocabulary.** Park Service Organic Act, bureau, interpretation

**Background.** On August 25, 1916, forty-four years after Yellowstone National Park was established, President Woodrow Wilson signed legislation creating a new federal bureau, the National Park Service, in the Department of the Interior. The act created the National Park Service to *conserve the scenery and the natural and historic objects and the wildlife therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations*. This mission statement (the Park Service Organic Act) continues to guide the management of the parks. Today, there are 376 units in the National Park System, covering more than 83 million acres in every state (except Delaware), the District of Columbia, American Samoa, Guam, Puerto Rico and the Virgin Islands.

Units of the National Park System have been created in two principle ways—Acts of Congress and presidential proclamations. Congress determines the name and designation for each unit. Units include national parks, monuments, battlefields, military parks, historical parks, historic sites, lakeshores, seashores, recreation areas, scenic rivers and trails, parkways and the White House. Collectively, these units represent America—its beauty, its history and its culture.

The National Park Service is composed of several thousand employees. All employees are public servants who have been entrusted to protect, interpret and administer the parks for the benefit of the people. However, park rangers cannot adequately care for 83 million acres alone. Without the support and assistance of the American people, parks will not survive past our present generation.



### **Suggested Procedure for Session One – Preparing the Soil**

1. Explain to students that they will collectively create one national park for their own community based on the natural resources in their neighborhood that they want to protect. Students will decide how they will represent the park. They can make a mural, a three-dimensional model, a video, a photo display or choose another method.
2. Inform students that when the park is completed, they will make a presentation that addresses the following: the park's mission, how visitors use the park, how natural resources are protected and the issues involved in managing the park.
3. Show students a video that introduces the National Park Service such as *The National Park Service: An American Legacy*. (Carlsbad Municipal Library carries over seventy National Park videos. Check your school or public library.) As an alternative, you may wish to invite a park ranger into your classroom for a special program to introduce the mission of the National Park Service.
4. Facilitate a class discussion about the National Park Service video. If you invite a park ranger into your class, set aside time at the end for a question and answer period.

### **Suggested Procedure for Session Two – Building the Foundation**

1. Discuss with students the different jobs and skills/knowledge involved in managing a park: biologist, planner, maintenance engineer, administrator, interpreter, teacher, safety specialist, manager, historian, botanist, recreation specialist, etc.
2. Divide students into groups of four, giving each group maps and brochures from a variety of national parks. Instruct them to look for information on the following: trails, restrooms, recreational activities (boating, fishing, swimming, camping) transportation, education, interpretation, orientation, lodging, food service, souvenirs, safety of visitors, waste disposal, protection of resources, parking, staff housing, historic structures, new buildings/development, boundaries, hours of operation, scenic overlooks, boardwalks, utilities (telephone, power), fees, park regulations, etc.
3. Have students collectively select the methods and materials they will use to create a model of their park.
4. Have students identify the threats/dilemmas facing the park—environmental degradation, vandalism, relic hunters, acid rain, adjacent development, visitor safety, transportation, public use, etc.
5. Assign each work group of four a specific task—trails, transportation, interpretation/education, safety, administration, etc.

**Suggested Procedure for Session Three – Building Walls and a Roof.** Have students work within their work groups to build the model.

**Suggested Procedure for Session Four – Adding the Décor.** Have students use the class period to complete their model and plan for a formal presentation.

**Suggested Procedure for Session Five – Ribbon Cutting Ceremony.** Have students make their presentations, keeping in mind what they were told in *Session One* about their park's mission, how visitors use the park, how natural resources are protected and the issues involved in managing the park.



## Who, Me, Make Lint?

### Pre-Visit and Field-Trip Activities

#### Primary/Elementary Level

**Science** (Science in Society), **Social Studies** (Geography)

**45 Minutes in Classroom plus Field Trip**

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**Objective(s).** Students will examine lint and explore its origins.

Students will discuss the detrimental effects of lint upon cave environment.

**Related NM Content Standards with Benchmarks.** SC16-E3, SS12-E5

**Method.** Students examine several readily available sources of lint and relate the knowledge to lint's effect upon caves.

**Materials.** dryer lint, magnifiers, hairbrushes (student-supplied)

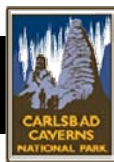
**Key Vocabulary.** lint, fibers, synthetic

**Background.** People shed about 107 pounds of skin in a 70-year lifetime, and lose 200 to 300 hairs daily! Fibers are shed by clothing. In five years, 100 pounds of lint were collected from Carlsbad Cavern. Effects of lint on a cave environment are not entirely known, but lint likely changes the biological balance by introducing a new food source, which may lure *foreign* species into the cave. Bacterial action, due to skin/hair build up and decomposing natural clothing fibers, corrodes speleothems.

#### Suggested Pre-Visit Procedure

1. Have students brush their hair with a clean hairbrush brought from home. Two or more students work together, but only one should brush his/her hair. Have students remove and count the hairs from the brush.
2. Distribute a clump of dryer lint and a magnifier to each group of students. Have students examine the lint through the magnifier to identify the various substances that compose the clump. The clump may contain hairs, dirt, skin flakes, fabric fibers, etc.
3. If the weather is dry, have students lightly scratch their arm to see skin flakes. The skin flakes are especially evident in a beam of sunlight.
4. Have students check uncarpeted low-traffic areas of their homes for dust bunnies as further evidence of lint.
5. After students have completed the exploration activities, facilitate a class discussion on the possible effects of lint on a cave environment. Lint is a foreign element in the cave; as such, it will result in changes to the environment. Skin, hair and natural fibers from clothing are all possible food sources for bacterial crickets, mites and other organisms. The bacteria can cause corrosion of the cave speleothems and provide a food source for larger species.

**Suggested Field-Trip Procedure.** Remind students of their lint exploration before you enter Carlsbad Caverns. Challenge students to find lint accumulation in the cave, without touching. Be especially aware of lint as you climb Appetite Hill, as this area is a prime lint collector.



## Lint Ecosystems

### Pre-Visit Activity

### Primary/Elementary Level

**Science** (Unifying Concepts, Inquiry, Science in Society),

**Social Studies** (Geography)

**10 Minutes per Day for 6 Weeks**

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**Objective(s).** Students will demonstrate how lint enters a cave.

Students will theorize about the effect lint has on a cave environment.

**Related NM Content Standards with Benchmarks.** SC2-E1, SC2-E3, SC6-E2, SC16-E3, SS12-E5

**Method.** Students place rocks in different areas of the classroom or school to experiment with lint build up.

**Materials.** water misting bottles, 6 rocks (Sandstone or limestone are recommended because they are porous and will collect and hold water.)

**Key Vocabulary.** lint

**Background.** Review background for “Who, Me, Make Lint?” activity.

### Suggested Procedure

1. Designate 3 rocks as wet rocks and 3 rocks as dry rocks. Wet the designated wet rocks with the mister.
2. Have students pick 3 different places to put the rocks. Ask the custodian not to dust or sweep these areas.
3. Place 2 rocks—one wet and one dry—in each area. (Place the wet rock on the right and the dry rock on the left so they will not be confused.)
4. Each day dampen the designated wet rock. Be sure not to get the dry rock wet.
5. Have students record their observations each week. Does the wet rock have more dust than the dry rock? Does one group of rocks have more dust than another group of rocks? Why? What effect could lint have on the cave environment?